



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/792,342	03/03/2004	Abaneshwar Prasad	100082DIV3	4543

29050 7590 04/06/2005

STEVEN D WESEMAN, ASSOCIATE GENERAL COUNSEL, IP  
CABOT MICROELECTRONICS CORPORATION  
870 NORTH COMMONS DRIVE  
AURORA, IL 60504

EXAMINER

VO, HAI

ART UNIT	PAPER NUMBER
----------	--------------

1771

DATE MAILED: 04/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/792,342

Applicant(s)

PRASAD, ABANESHWAR

Examiner

Hai Vo

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 0303, 1008, 0707.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, and 6-9 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Winings (US 4,239,567).

Winings teaches a polishing pad comprising a microcellular polyurethane foam 48.

There is no teaching or suggestion that the microcellular foam contains abrasive particles. The microcellular foam is smooth in appearance (column 4, lines 54-55).

Likewise, the foam has no surface textures. It appears that the foam of Winings

meets all the structural limitations as required by the claims. The foam contains no

abrasive particles and comprises no externally produced surface texture. Therefore,

it is not seen that the polyurethane polishing pad would have performed differently than the claimed polishing pad in terms of the compressibility, rebound property, hardness and polishing performance, i.e., polishing the silicon dioxide wafer at a rate of at least 600 Å/min with a carrier down force pressure of 0.028 Mpa, a slurry flow rate of 100 ml/ml, a platen rotation speed of about 60rpm, and a carrier rotation speed of about 55 rpm to about 60 rpm. It seems from the claim, if one meets the structure recited, the properties must be met or Applicant's claim is incomplete. This is in line with *In re Spada*, 15 USPQ 2d 1655 (1990) which holds that products of identical chemical composition can not have mutually exclusive properties. The same token is applied to the flexural modulus, rheology, glass transition temperature and melt transition temperature of the polyurethane. Like material has like property. It is the examiner's position that the flexural modulus, rheology, glass transition temperature and melt transition temperature would be inherently present. This is also in line with *In re Spada*, 15 USPQ 2d 1655 (1990). Accordingly, Wings anticipates or strongly suggests the claimed subject matter. Note *In re Best* 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made under 35 USC 102.

4. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winings (US 4,239,567) as applied to claim 1 above, and further in view of Ogawa et al (US 6,790,883). Winings does not specifically disclose the polishing pad comprising a water-soluble polymer such as cross-linked polyacrylic acid. Ogawa, however, teaches a polishing pad comprising a polyacrylic acid and a cross-linking

agent. Since polyacrylic acid is cross-linkable, therefore, it is not seen that the polyacrylic acid is not cross-linked in the presence of the cross-linking agent.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the water-soluble polymer in the polishing pad motivated by the desire to increase an indentation hardness of the polishing pad, thereby improving the removal rate (Ogawa, column 6, lines 16-25).

5. Claims 2-5, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winings (US 4,239,567) as applied to claim 1 above, and further in view of Perman et al (US 5,670,102). Winings does not specifically disclose the void size, porosity, cell density and closed cell structure of the microcellular polyurethane foam. Perman teaches a microcellular foam made from polyurethane having closed cells with a void size of 10 microns, a void volume from 5 to 97% and a cell density about  $10^9$  voids /cm<sup>3</sup> (column 5, line 24, 36, and column 2, lines 33-35, table 1).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the microcellular foam having a closed cell structure, a void volume and cell density instantly claimed because such features are known in the microcellular art and Perman provides necessary details to practice the invention of Winings.

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Winings (US 4,239,567) as applied to claim 1 above, and further in view of Kihara et al (US 6,239,188). Winings does not specifically disclose the polyurethane foam having a bimodal pore size distribution. Kihara, however, teaches a polishing pad made from

Art Unit: 1771

polyurethane comprising two types of cells having different sizes by adding two types of expanded microspheres with two different particle sizes (abstract). The formation of the two type of cells leads to a large amount of abrasive grains from the slurry to held on the polishing pad, thereby improving polishing performance while reducing scratching of the polished surface (column 5, lines 1-7). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the microcellular foam having a bimodal pore size distribution motivated by the desire to improve polishing performance and reduce scratching of the polished surface.

7. Claims 1, and 4-10 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Xu et al (US 6,406,363). Xu teaches a polishing pad comprising a microcellular polyurethane having a cell from 0.1 to 1000 microns encompassing the claimed range (column 4, lines 26-27). Xu teaches that the chemical solution contains no abrasive particles, the polishing pad needs to include abrasive particles (column 3, lines 32-35). Xu teaches the slurry contains abrasive particles (column 3, lines 18-20). Therefore, the abrasive particles are not necessarily contained in the polishing pad itself. Xu discloses the polishing surface is smooth or textured (column 5, line 31). Likewise, the foam has no surface textures. The polishing pad further comprises a thermoplastic polymer (column 4, lines 10-15). It appears that the foam of Xu meets all the structural limitations as required by the claims. The foam contains no abrasive particles and comprises no externally produced surface texture. The foam has the cell size encompassing the

Art Unit: 1771

claimed range. The polishing pad further comprises a polymeric resin as required by the claims. Therefore, it is not seen that the polyurethane polishing pad would have performed differently than the claimed polishing pad in terms of the compressibility, rebound property, hardness and polishing performance, i.e., polishing the silicon dioxide wafer at a rate of at least 600 Å<sup>2</sup>/min with a carrier down force pressure of 0.028 Mpa, a slurry flow rate of 100 ml/ml, a platen rotation speed of about 60 rpm, and a carrier rotation speed of about 55 rpm to about 60rpm. It seems from the claim, if one meets the structure recited, the properties must be met or Applicant's claim is incomplete. This is in line with *In re Spada*, 15 USPQ 2d 1655 (1990) which holds that products of identical chemical composition can not have mutually exclusive properties. The same token is applied to the flexural modulus, rheology, glass transition temperature and melt transition temperature of the polyurethane. Like material has like property. It is the examiner's position that the flexural modulus, rheology, glass transition temperature and melt transition temperature would be inherently present. This is also in line with *In re Spada*, 15 USPQ 2d 1655 (1990). Accordingly, Xu anticipates or strongly suggests the claimed subject matter. Note *In re Best* 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made under 35 USC 102.

8. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al (US 6,406,363) as applied to claim 1 above, and further in view of Ogawa et al (US 6,790,883). Xu does not specifically disclose the polishing pad comprising a water-soluble polymer such as cross-linked polyacrylic acid. Ogawa, however,

Art Unit: 1771

teaches a polishing pad comprising a polyacrylic acid and a cross-linking agent.

Since polyacrylic acid is cross-linkable, therefore, it is not seen that the polyacrylic acid is not cross-linked in the presence of the cross-linking agent. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the water-soluble polymer in the polishing pad motivated by the desire to increase an indentation hardness of the polishing pad, thereby improving the removal rate (Ogawa, column 6, lines 16-25).

9. Claims 2, 3, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al (US 6,406,363) as applied to claim 1 above, and further in view of Perman et al (US 5,670,102). Xu does not specifically disclose the porosity, cell density and closed cell structure of the microcellular polyurethane foam. Perman teaches a microcellular polyurethane foam having closed cells, a void volume from 5 to 97% and a cell density about  $10^9$  voids /cm<sup>3</sup> (column 5, line 24, 36, and column 2, lines 33-35). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the microcellular foam having a closed cell structure, a void volume and cell density instantly claimed because such features are known in the microcellular art and Perman provides necessary details to practice the invention of Xu.
10. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al (US 6,406,363) as applied to claim 1 above, and further in view of Kihara et al (US 6,239,188). Xu does not specifically disclose the polyurethane foam having a bimodal pore size distribution. Kihara, however, teaches a polishing pad made from



Art Unit: 1771

polyurethane comprising two types of cells having different sizes by adding two types of expanded microspheres with two different particle sizes (abstract). The formation of the two type of cells leads to a large amount of abrasive grains from the slurry to held on the polishing pad, thereby improving polishing performance while reducing scratching of the polished surface (column 5, lines 1-7). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the microcellular foam having a bimodal pore size distribution motivated by the desire to improve polishing performance and reduce scratching of the polished surface.

11. Claims 1-10 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over West, Jr. (US 2003/0100250). West, Jr. teaches a polishing pad comprising a felt impregnated with a polyurethane resin, having a shore D hardness, density, compressibility and rebound within the claimed ranges [0043]. The polishing pad having a pore size from 5 to 150  $\mu\text{m}$  encompassing the claimed range [0028]. There is no teaching or suggestion that the polishing pad comprises abrasive particles and surface texture. The polishing pad further comprises a thermoplastic polymer [0029]. It appears that the polishing pad of West, Jr. meets all the structural limitations as required by the claims. The polishing pad contains no abrasive particles and comprises no externally produced surface texture. The polishing pad has the cell size encompassing the claimed range. The polishing pad further comprises a polymeric resin as required by the claims. The polishing pad has having a shore D hardness, density, compressibility

Art Unit: 1771

and rebound within the claimed ranges. Therefore, it is not seen that the polyurethane polishing pad would have performed differently than the claimed polishing pad in terms of the polishing rate, i.e., polishing the silicon dioxide wafer at a rate of at least 600 Å<sup>2</sup>/min with a carrier down force pressure of 0.028 Mpa, a slurry flow rate of 100 ml/ml, a platen rotation speed of about 60 rpm, and a carrier rotation speed of about 55 rpm to about 60 rpm. It seems from the claim, if one meets the structure recited, the properties must be met or Applicant's claim is incomplete. This is in line with *In re Spada*, 15 USPQ 2d 1655 (1990) which holds that products of identical chemical composition can not have mutually exclusive properties. The same token is applied to the flexural modulus, rheology, glass transition temperature and melt transition temperature of the polyurethane. Like material has like property. It is the examiner's position that the flexural modulus, rheology, glass transition temperature and melt transition temperature would be inherently present. This is also in line with *In re Spada*, 15 USPQ 2d 1655 (1990). West, Jr. does not disclose the porosity. However, West discloses a low porosity corresponds to a high-density and vice versa. The polishing pad has a density within the claimed range. It is the examiner's position that porosity would be inherently present within the claimed range as the density is within the claimed range. Accordingly, West, Jr. anticipates or strongly suggests the claimed subject matter. Note *In re Best* 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made under 35 USC 102.

Art Unit: 1771

12. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over West, Jr. (US 2003/0100250) as applied to claim 1 above, and further in view of Ogawa et al (US 6,790,883). West does not specifically disclose the polishing pad comprising a water-soluble polymer such as cross-linked polyacrylic acid. Ogawa, however, teaches a polishing pad comprising a polyacrylic acid and a cross-linking agent. Since polyacrylic acid is cross-linkable, therefore, it is not seen that the polyacrylic acid is not cross-linked in the presence of the cross-linking agent. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the water-soluble polymer in the polishing pad motivated by the desire to increase an indentation hardness of the polishing pad, thereby improving the removal rate (Ogawa, column 6, lines 16-25).

### ***Double Patenting***

13. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

14. Claims 1-15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13, 15 and

Art Unit: 1771

16 of copending Application No. 10/792,183. Claims 1-13, 15 and 16 of Copending Application No. 10/792,183 are completely silent as to the surface texture and abrasive particles present in the polishing pad. Claims of copending Application No. 10/792,183 teach every element of the claimed subject matter except the polishing rate, compressibility, rebound property, shore D hardness and cell density. However, it appears that the polishing pad of copending Application No. 10/792,183 is made from the same materials as that of the present invention. Both the polyurethane foam materials have a closed cell structure, a bimodal pore size distribution, void volume within the claimed range. Therefore, it is not seen that the polishing pad of copending Application No. 10/792,183 could have performed differently than that of present invention in terms of the polishing rate, compressibility, rebound property, shore D hardness and cell density.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

15. Claims 1-15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15, and 17-31 of copending Application No. 10/281,782. Claims 1-15, and 17-31 of Copending Application No. 10/281,782 are completely silent as to the surface texture and abrasive particles present in the polishing pad. Claims of copending Application No. 10/281,782 teach every element of the claimed subject matter except the polishing rate, compressibility, rebound property, and shore D hardness. However, it appears that the polishing pad of copending Application No. 10/281,782 is made from the

Art Unit: 1771

same materials as that of the present invention. Both the polyurethane foam materials have a closed cell structure, void size, void volume, cell density within the claimed ranges. Therefore, it is not seen that the polishing pad of copending Application No. 10/281,782 could have performed differently than that of present invention in terms of the polishing rate, compressibility, rebound property, and shore D hardness.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Conclusion***

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (571) 272-1485. The examiner can normally be reached on M,T,Th, F, 7:00-4:30 and on alternating Wednesdays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1771

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HV

Hai Vo  
Tech Center 1700